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imagine that the line of division is crossed when one encounters the overwhelming verbiage of ancient morphology and taxonomy, so dear to English texts.

From the standpoint of logical presentation the book is a curiosity. The first part is general, discussing "external morphology, physiology, and general histology" in a way that compels the author to say, "it is not expected that the student will be able to master the contents of the opening chapters at the first reading." The second part deals with "the angiosperm" in rather a detailed way, and, of course, it is in connection with this topic that the glossary style of presentation appears. The third part deals with "vascular cryptogams and flowering plants." Thus, after the angiosperms are presented the ferns are taken up, then the equisetums, club mosses, and gymnosperms. Only at this point can the real homologies of angiosperm structure be indicated. The fourth and last part deals with "the lower cryptogams," and one advances from liverworts to mosses, and then backs down to algæ and fungi. This curious zigzag course does not have the excuse that the more recondite homologies are not being considered, for they are. The actual material in the book could be arranged into an orderly presentation of the evolution of the plant kingdom.

The book is an excellent compendium of facts for reference or topical reading, and probably indicates that the examinations provided for demand facts rather than principles. The illustrations are not of the first order, either in the original drawing, or in the reproduction. There is no longer any need for crude and harsh figures, even in elementary texts.—J. M. C.

The Schwendener Festschrift.

IN honor of the seventieth birthday of Professor Dr. Simon Schwendener, of the University of Berlin, twenty-four of his pupils have prepared a *Festschrift* by publishing together a series of papers under the title *Botanische Untersuchungen*.³ A fine photogravure of Schwendener forms a frontispiece of the volume.

Had Schwendener done nothing but inspire so energetic a group of investigators as are represented in these pages he would have done a great work for the advancement of knowledge. But the recent publication of his own collected papers has shown the great source of the inspiration which these pupils received, namely his own vigorous research. Surely three such volumes as these will at once fittingly commemorate and exemplify the life work of a great teacher.

It is impossible to discuss in detail the contributions which make up this

³ *Botanische Untersuchungen*, S. Schwendener zum 10. Februar, 1899, dargebracht. 8vo. pp. viii+470. *figs.* 45. *pl.* 14, and portrait. Berlin: Gebrüder Bornträger. 1899. *M* 25.

"birthday book." The mere list of contributions it contains will suffice to show that it is a necessary volume for every botanical library. The topics show a wide range, In physiology Möbius writes on the motor organs of petioles; Westermaier on stomata and their accessory apparatus; Steinbrinck on the hygroscopic mechanism of anthers and plant hairs; Grüss on the action of various enzymes; Kolkwitz on the growth of the chlorophyll bands of *Spirogyra*; Wille on the migration of inorganic nutritive materials in the Laminariaceæ; Fünfstück on the excretion of fat by calcareous lichens; Reinhardt on plasmolytic studies upon the growth of the cell wall; and Tschirch on the formation of resin.

Under physiological morphology may be enumerated the contributions of Haberlandt on the experimental production of a new organ in *Conocephalus ovatus*; and Heinricher on the regenerative power of the bulblets of *Cystopteris*. To morphology proper belong the papers of Lindau on the lichen genus *Gyrophora*; Bitter on the meshlike perforations of the lower tissue or the whole thallus of various foliaceous and fruticose lichens; Weisse on the development of the flower of Onagraceæ, with especial reference to the inferior ovary; Jahn on the myxomycete *Comatricha obtusata*; Schellenberg on the development of the stem of *Aristolochia Sipho*; Kuckuck on the polymorphy of certain Phæosporeæ; and Correns on the apical growth, phyllotaxy, and branch rudiments of moss stems.

Ecological contributions are those by Giesenhagen on adaptive phenomena of certain epiphytic ferns; Schumann on epiphytic cactuses; Volkens on the pollination of certain Loranthaceæ and Proteaceæ by birds; Holterman on termites and fungi; and Marloth on the leaf sheaths of *Watsonia Meriana* as water-absorbing organs.—C. R. B.

NOTES FOR STUDENTS.

PALLA describes a new Phyllactinia⁴ (*P. Berberidis*) and points out that the species of this genus do not form haustoria in the epidermis of the host, but send lateral hyphæ through the stomata into the intercellular spaces of the spongy parenchyma. These hyphæ alone form haustoria. In this the genus differs from the rest of the Erysiphææ which have been investigated.—C. R. B.

MR. FRANCIS RAMALEY has been investigating numerous seedlings of woody plants, and two published papers (*Min. Bot. Studies* 2: 69-136. 1899) contain some of the results. The first is entitled "Seedlings of certain woody plants," in which numerous interesting facts are recorded, and the general conclusion reached "that broad generalizations in regard to the shape of cotyledons in plant families cannot be safely made without a considerable mass of data." The second paper, entitled "Comparative

⁴ Ber. d. deutsch. bot. Gesells. 17: 64. 1899.